IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Takeshi Oohashi et al.
Serial No. : 09/926,033
Filed : November 7, 2001 (PCT filing date: March 2, 2000)
For : PHOTOSENSITIVE RESIN COMPOSITION, PHOTOSENSITIVE ELEMENT USING THE SAME, PROCESS FOR PRODUCING RESIST PATTERN AND PROCESS FOR PRODUCING PRINTED WIRING BOARD
Art Unit & Examiner : Art Unit 1752
Examiner Thornton, Yvette C

DECLARATION UNDER 37 CFR 1.132

Assistant commissioner for Patents
Washington, D.C. 20231

Sir:

I, Takeshi Oohashi, Japanese citizen, residing at c/o Hitachi Chemical Company, Ltd., Yamazaki Works, 4-13-1, Higashicho, Hitachi-shi, Ibaraki 317-8555 Japan, declare and state that;

1. I have a degree in engineering, which was conferred upon me by Hokkaido University, Graduate school of Engineering in Sapporo-shi, Hokkaido, Japan, in March, 1997.

2. I and have been employed by Hitachi Chemical Co., Ltd. since April, 1997, and I have had a total of eight years of work and research experience in the development of photosensitive film.

3. I am one of the named inventors of the above-identified application and am familiar with the subject matter disclosed in said application.

4. In compliance with the wishes of Ex. Thornton in the Office Action dated June 1, 2005, I conducted Experiment No. 12 (comparative example) using a component comprising binder *2, 2,2-dimethoxy-2-phenylacetophenone, trimethylolpropane triacrylate, leuco crystal violet (+ malachite green), 2,2'-methylene-bis(4-ethyl-6-tert-butylphenol), benzotriazole, methyl ethyl ketone and nonylphenoxyhexaethylenoxy acrylate (m=6).

Experiments 7-11 are the same as those presented in the previously filed declaration.

By using the components of Experiment 12, the preparation of a solution of a photosensitive resin composition and a photosensitive element and the evaluation of adhesion and scum were repeated in the same manner as in Example 1 of the applicant's specification.

The results of the experiment are given in the following table.

The results of the evaluations in the table are as follows:

Adhesion: the width of the narrowest fine line remained adhering after developing.

Low tendency to scum:

No: Scum did not occur.

Yes: Scum occurred.

In Experiment 12, Nonylphenoxyhexaethylenoxy acrylate (m=6) is used, but a 2,4,5-triarylimidazole dimer essential in the claimed composition is not used. As shown in the Table, the composition of this experiment does not generate scum, but is inferior in adhesion as compared with the claimed composition.

	Components	Ex.	Experiments					
		1	7	8	9	10	11	***12***
(A)	Binder polymer	60g *1	60g *2	60g *2	60g *1	60g *1	60g *1	***60g *2***
(B)	2-(o-chlorophenyl)-4,5-diphenylimidazole dimer	3.0g	-	-	-	3.0g	-	-
	2-(o,p-dichlorophenyl)-4,5-diphenylimidazole dimer *3	-	-	-	3.0g	-	-	-
	Benzoic acid, 2,2'-[4,4',5,5'-tetraphenyl][1,1'-bi-1H-imidazole]2,2'-diyl)bis-dimethyl ester *4	-	-	-	-	-	3.0g	-
	2,2-dimethoxy-2-phenylacetophenone	-	6g	6g	-	-	-	***6g***
	N,N'-tetraetyl-4,4'-diamino-benzophenone	0.2g	-	-	0.2g	0.2g	0.2g	-
(C)	Nonylphenoxyhexaethylen-oxy acrylate (m=6)	10g	-	-	10g	10g	10g	***15g***
	Phenoxytetraethylenoxy acrylate (m=4)	-	15g	-	-	-	-	-
	Phenoxydiethylenoxy acrylate (m=2)	-	-	15g	-	-	-	-
	EO,PO-modified urethane dimethacrylate	10g	-	-	10g	10g	10g	-
	2,2-bis[4-(methacryloxypenta-ethoxy)phenyl]propane	20g	-	-	20g	-	20g	-
	Diethylene glycol diacrylate	-	-	-	-	20g	-	-
	Trimethylolpropane triacrylate	-	20g	20g	-	-	-	***20g***
Others	Leuco crystal violet	0.5g	0.5g	0.5g	0.5g	0.5g	0.5g	***0.5g***
	2,2'-methylene-bis(4-ethyl-6-tert-butylphenol)	-	0.2g	0.2g	-	-	-	***0.2g***
	Benzotriazole	-	0.15g	0.15g	-	-	-	***0.15g***
	Malachite green	0.05g	0.05g	0.05g	0.05g	0.05g	0.05g	***0.05g***
Solve-nt	Methyl ethyl ketone	-	60g	60g	-	-	-	***60g***
	Acetone	10.0g	-	-	10.0g	10.0g	10.0g	-
	Toluene	10.0g	-	-	10.0g	10.0g	10.0g	-
	Methanol	3.0g	-	-	3.0g	3.0g	3.0g	-
	N,N-dimethylformamide	3.0g	-	-	3.0g	3.0g	3.0g	-
Adhesion (μm)		20	32	32	20	22	20	***32***
Scum		No	No	No	No	No	No	***No***

1: Copolymer of methacrylic acid/styrene/methyl methacrylate = 20wt%/20wt%/60wt% Mw 60,000, Acid value: 130 mgKOH/g

*2: Copolymer of methacrylic acid/styrene/methyl methacrylate/butyl acrylate = 30wt%/23wt%/35wt%/11wt%

*3: Hodogawa Chemical Co., Ltd.

*4: Hampford Research Inc.

6. The undersigned DECLARANT declares further the all statements made herein of his/her own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that the willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Executed this 12th day of August, 2005.

Takeshi Ohashi

Takeshi Oohashi